REMARKS

Claims 1 and 3 – 23 are pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

Claims 1 and 9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kuroda (U.S. Pat. No. 5,794,170). This rejection is respectfully traversed.

Claims 1 and 9 include selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load. Kuroda fails to teach or suggest selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load.

The present invention selectively inhibits downshift of the transmission to ensure that the vehicle does not lose traction as a result of the transmission shift (i.e., a rapid change from a higher gear to a lower gear). More specifically, the square of a current traction load (e.g., CTL) is compared to the square of a traction load (e.g., MTTL) and based on this magnitude comparison, a determination of whether to inhibit a downshift is made. In this manner, a downshift that could result in a loss of traction is inhibited.

Kuroda discloses a downhill coast detection system that determines whether a vehicle is coasting downhill. If the vehicle is coasting downhill, the system downshifts a transmission of the vehicle to enable engine braking to slow the vehicle. More specifically, the system of Kuroda includes a throttle sensor that detects a degree of throttle opening, a first speed derivative calculating means and a second speed

derivative calculating means (see Figures 1 and 3). A downhill coast detection means determines that the vehicle is coasting downhill if the throttle is closed, the first speed derivative is positive and the second speed derivative is at or near zero (see Col. 9, Lines 9 – 14). If the downhill coast situation is detected for a sufficient time (i.e., $t_{BRK} > t_D$), the transmission is automatically downshifted to decelerate the vehicle via engine braking (see Col. 10, Lines 51 – 58).

The downhill coast detection system of Kuroda fails to teach or suggest calculation or comparison of either a square of a current traction load or a square of an estimated traction load. Further, the downhill coast detection coast system of Kuroda fails to teach or suggest inhibiting a downshift based on traction loads. Therefore, reconsideration and withdrawal of the rejections are respectfully requested.

Claims 1 and 9 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Abiru (U.S. Pat. No. 6,671,601). This rejection is respectfully traversed.

Claims 1 and 9 include selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load. Abirua fails to teach or suggest selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load.

Abiru discloses a control system for a continuously variable transmission (CVT). The CVT control system determines an effective traction ($F_{o/s}$) for an uphill, wide open-throttle condition or a downhill, closed-throttle condition (see Col. 10, Lines 1 – 20 and Col. 11, Lines 49 – 57). A desired traction (F_d) is determined for the current driving condition (see Col. 12, Lines 12 – 36). A speed change ratio of the CVT (i.e., the ratio of the speeds of the primary pulley and the secondary pulley) is adjusted to bring the

effective traction closer to the desired traction. In this manner, the control system inhibits excessive engine speed increases and suppresses vibration and noise (see Col. 2, Lines 10 – 17).

As is known in the art, a CVT provides an infinite number of speed ratios between a minimum and a maximum speed ratio. Therefore, the change between speed ratios, either up or down, is constant and smooth, and does not result in a rapid change in torque to the wheels of the vehicle. The CVT control system of Abiru directs the change in speed ratio based on F_d and $F_{o/s}$ so the CVT is always at an optimal speed ratio. Abiru does not inhibit downshifts to avoid loss of traction as a result of a rapid change in torque delivered to the wheels. As discussed above, rapid changes in torque output are not an issue with CVTs. Therefore, Abiru fails to teach or suggest selectively inhibiting a downshift of the transmission based on a current traction load and a traction load and shifting the transmission if the driving conditions are met. Accordingly, reconsideration and withdrawal of the rejections are respectively requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1 and 3 – 21 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of Kondo (U.S. Pat. No. 5,655,995) and further in view of Aribu (U.S. Pat. No. 6,671,601) and Kuroda (U.S. Pat. No. 5,794,170). This rejection is respectfully traversed.

Claims 1, 9 and 16 include selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load.

Kondo fails to teach or suggest selectively inhibiting a downshift of the transmission if a square of a current traction load is less than a square of an estimated traction load. Aribu and Kuroda fail to cure the deficient teachings of Kondo.

Kondo discloses a system that adjusts the shift points of an automatic transmission based on driver performance. The system disclosed in Kondo determines a degree of aggressiveness (SP(i)) (i.e., sporty driving) based on a degree of engine performance usage (SPTE) and a degree of tire performance usage (SPG) (see Col. 21 – 22, Equations 13 – 15). SPG indicates the degree to which grip performance of the tire is used and is based on a lateral acceleration (GY) and a longitudinal acceleration (GX) (see Col. 21, Equation 12). The transmission shift pattern is changed based on SP(i) (see Col. 22, Lines 23 – 28). More specifically, a driving characteristic equivalent shift pattern is determined by interpolating shift points between a normal shift pattern and a sporty shift pattern based on SP(i) (see Col. 22, Lines 29 – 41).

In summary, the system disclosed in Kondo adjusts the transmission shift pattern to match the driver's driving habits. However, actual transmission shifts are commanded based only on vehicle speed and engine load (see Col. 19, Lines 41 – 47). Therefore, Kondo fails to teach or suggest selectively inhibiting a downshift based on a current traction load and a traction load.

As discussed in detail above, Kuroda discloses a downhill coast detection system and initiates a downshift if a downhill coast condition is detected to slow the vehicle using engine braking. Kuroda fails to teach or suggest selectively inhibiting a downshift if a square of a current traction load is less than a square of an estimated traction load. Therefore, Kuroda fails to cure the deficient teachings of Kondo.

Abiru discloses a CVT control system that adjusts the speed ratio of a CVT based on a desired traction and an effective traction. The CVT control system adjusts a speed ratio of the CVT so that the effective traction tracks the desired traction. Abiru, however, fails to selectively inhibit a downshift when a downshift is desired to avoid a loss of traction as a result of a rapid torque change to the wheels. As discussed in detail above, rapid torque changes to the wheels are not an issue with CVTs. Therefore, Abiru fails to cure the deficient teachings of Kondo.

Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

Claims 3 – 8 ultimately depend from claim 1, which defines over the prior art as discussed in detail above. Therefore, claims 3 – 8 define over the prior art for at least the reasons discussed with respect to claim 1, and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 10 – 15 ultimately depend from claim 9, which defines over the prior art as discussed in detail above. Therefore, claims 10 – 15 define over the prior art for at least the reasons discussed with respect to claim 9, and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 17 – 21 ultimately depend from claim 16, which defines over the prior art as discussed in detail above. Therefore, claims 17 – 21 define over the prior art for at least the reasons discussed with respect to claim 16, and reconsideration and withdrawal of the rejections are respectfully requested.

NEW CLAIMS

Claims 22 and 23 have been added and claim a shift control system and method, respectively, that selectively inhibit a transmission downshift if a magnitude of a current traction load is less than a magnitude of an estimated traction load. Applicant respectively notes that none of the prior art references, discussed in detail above, teach or suggest inhibiting a transmission downshift if a magnitude of a current traction load is less than a magnitude of an estimated traction load. Therefore, Applicant looks forward to positive consideration of new claims 22 and 23.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (313) 665-4969.

Respectfully submitted,

Dated: 8/19/05

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